

AMEREN-CIPS

REVISED 1998

**GENERAL ASSESSMENT
OF ELECTRIC SERVICE**

JULY 1999

Ameren-CIPS 1998 Reliability Assessment

I. Introduction

Ameren-CIPS presents this 1998 General Assessment of Electric Reliability to the Illinois Commerce Commission in accordance with Section 411.160 of the 83 Illinois Administrative Code 411.

Ameren-CIPS is nearing the completion of its AM/FM conversion project that is necessary to obtain interruption reporting at the customer specific level beginning in 1999. In addition, our outage tracking system was not capable of tracking controllable interruptions. We will be able to meet this requirement in 1999.

II. Customer Satisfaction Survey

Generally speaking, our customers considered Ameren-CIPS to be a good provider of reliable electric service at a cost comparable to other electric service providers as evidenced by our annual customer survey. The results of this survey are detailed in Attachment A.

[411.120 b) 3) G) v)]

III. Distribution and Transmission Facilities Financial Information

A. Nearly all Distribution and Transmission expenditures have an impact towards maintaining or improving reliability. Ameren-CIPS plans to make the following expenditures for this year and the following 3 years, 1999-2002.

	1999	2000	2001	2002
Distribution	\$64,821,000	\$70,601,000	\$70,973,000	\$72,328,000
Transmission	\$11,737,000	\$14,650,000	\$21,865,000	\$21,195,000
Expenditures are in constant 1998 dollars (assuming a 2.5% inflation rate)				

[411.120 b) 3) A)]

These values are also included on Attachment B where these values are compared to our Distribution and Transmission Plant investment and average remaining depreciation lives.

[411.120 b) 3) G) iii) & iv)]

Included as Attachment C are the relevant characteristics of each operating area and a qualitative assessment of the equipment and facilities in each operating area.

Ameren-CIPS only maintains facility age records for the company as a whole, not on an operating area basis.

[411.120 b) 3) G) i)]

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B. There are numerous operating practices performed at Ameren-CIPS which are performed on a periodic basis that do have direct bearing upon reliability. Nearly all of these activities are performed to allow Ameren-CIPS to identify problems and potentially prevent customer interruptions from occurring. These practices will not be identified as specific reliability projects. Some of the more important ones are noted below:

1. Periodic Substation Inspections
2. Infra-red Scanning Substations on Periodic Basis
3. Substation and Relay Equipment Maintenance and Testing on Periodic Basis
4. Line Inspections on a Periodic Basis
5. Installation of Anti-Galloping Conductors in Susceptible Areas
6. Installation of Animal Protective Guards in Susceptible Areas
7. Periodic Review of System Reliability and System Loadings

C. Specific Reliability Projects

[411.120 b) 3) A) iii) iv) viii)]

Ameren-CIPS does consider the effects on customers and the cost of reducing the number of planned and unplanned interruptions in our reliability projects.

1. Aerial Sub-transmission Infrared Inspection - The present plan is to perform an aerial inspection of the sub-transmission system on a 3-year cycle. This project enables Ameren-CIPS to identify and fix problems (loose connections, weak splices, air break switches, etc.) before any interruptions might actually occur.
2. Worst Performing Feeders - From outage information, the worst performing feeders are identified annually. The worst performing feeders list is developed based on the previous year's historical performance and can not be specifically projected into the future. There is a formalized reporting process to ensure that proper steps are taken in the problem analysis and remediation identification processes. The evaluation criteria for determining these are not strictly determined from CAIFI, SAIDI, or CAIDI.
3. Lightning Protection - Identification of where lightning protection enhancement projects can provide major benefits will continue. The lightning protection projects list is developed based on the previous 3-year's historical performance and recommendations by the regions.
4. Pole Inspection and Treatment - Data collected in the first phase of the sub-transmission and distribution backbone inspection will be analyzed to evaluate such things as percent of poles that failed test, percent reinforcement, etc. By performing this inspection, we will be able to identify and replace or repair poles that might otherwise fail and result in unplanned customer interruptions. This is an on-going reliability project.

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5. Annual Tree Trimming – Trimming distribution and transmission circuits will continue on a periodic cycle. The crews use “natural” tree trimming methods that are intended to direct future tree growth away from power lines.

D. Unresolved Reliability Complaints

Ameren-CIPS has no unresolved reliability complaints from other entities.

[411.120 b) 3) A) vi)]

IV. Interruption Information

A. Number and Duration of Planned and Unplanned Interruptions

Below is the data associated with Ameren-CIPS planned and unplanned interruptions.

The impact on customers of planned and unplanned interruptions are inconveniences to the customer since they have no electricity during the interruption.

	# of Interruptions	Duration
Planned Interruptions	115	21,706 hours
Unplanned Interruptions	1011	372,146 hours

[411.120 b) 3) C)]

B. Number and Causes of Controllable Interruptions

Ameren-CIPS was unable to track controllable interruptions for 1998.

[411.120 b) 3) D)]

C. Number of Interruptions Due to Other Electric Supplier

Ameren-CIPS was unable to track this information for 1998.

[411.120 b) 3) E)]

D. Comparison of Interruption Frequency and Duration for Customers with Alternative Electric Supplier

In 1998, Ameren-CIPS had no customers with Alternative Electric Suppliers.

[411.120 b) 3) F)]

E. Overview of Customers’ Reliability Complaints

Ameren-CIPS had no formal reliability complaints from customers for 1998.

[411.120 b) 3) E)]

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V. Service Reliability Information – Company Wide

A. Ameren-CIPS experienced the following SAIFI and CAIDI reliability indices for 1998:

DIVISION	SAIFI	CAIDI	CAIFI
SOUTHERN	.702	137	N/A
WESTERN	.443	109	N/A
EASTERN	.881	118	N/A
COMPANY	.661	122	N/A

[411.120 b) 3) H)]

B. Below is a summary of the interruptions by Cause Category experienced by Ameren-CIPS for 1998:

CAUSES	# OF INTER- RUPTIONS	% TOTAL INTER- RUPTIONS	CUSTOMER MINUTES OUT	% CUSTOMER MINUTES OUT
Other Alternative Retail Electric Supplier	0	0	0	0
Jurisdictional Entity / Contractor Personnel- Errors	23	2.0 %	88057	.4 %
Customer	N/A	N/A	N/A	N/A
Public	68	6.0 %	989680	4.2 %
Weather Related	282	25.0 %	6912210	29.3 %
Animal Related	36	3.2 %	452478	1.9 %
Tree Related	226	20.1 %	7658425	32.4 %
Overhead Equipment Related	186	16.5 %	3643865	15.4 %
Underground Equipment Related	32	2.8 %	458855	1.9 %
Intentional	115	10.2 %	1302368	5.5 %
Transmission and Substation Related	N/A	N/A	N/A	N/A
Unknown	132	11.7 %	1359015	5.5 %
Other	26	2.3 %	766202	3.2 %

Note: Southern Division is the same as Shawnee Region; Western Division consisted of Eagle View and Four Rivers Regions; and Eastern Division consisted

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of Wabash, Heritage, and Northern Prairie Regions.
[411.120 b) 3) G) ii)]

C. Ameren-CIPS received no ICC service reliability complaints for 1998.
[411.120 b) 3) G) vi)]

VI. Service Reliability Information – Operating Areas

A. For 1998, the program we utilized to capture interruption information was based upon 3 Operating Divisions. We have recently re-organized our operations and in the future will report on 6 Operating Regions whose qualitative characteristics are included as Attachment C. Because Ameren-CIPS is reorganizing as well as changing outage-tracking software, we believed that it was more important for 1998 to review the circuits on a company basis. For our approximately 1100 distribution circuits, the SAIFI and CAIDI indexed circuits addressed below are evenly spread across the 3 Operating Divisions.

B. Listed below are Ameren-CIPS’ worst-performing distribution circuits when ranked by SAIFI, CAIDI, and CAIFI (not for 1998) indices:

SUBSTATION	CIRCUIT	SAIFI
Z37	531	7
V61	563	6.1
S93	504	5.3
S27	599	5
Y20	522	4.2
T04	512	4.1
Y07	576	4
U84	534	4
S15	560	4
U42	512	3.9
Y04	504	3.6

SUBSTATION	CIRCUIT	CAIDI
T11	508	631
T04	513	628
S86	597	590
S22	595	510
X55	542	499
Y20	2	499
Y59	520	496
S79	510	460
V95	586	457
Z16	518	445
S13	550	441

[411.120 b) 3) I)]

VII. Operating & Maintenance History of Worst-Performing Circuits with Action Plans

[411.120 b) 3) J)]

Substation Z37, Circuit 531

Outage History

There were a number of outages that occurred on this distribution feeder. The first outage occurred when a 69KV shield wire broke in extremely cold conditions and fell into this circuit and also blew the 69/12.5KV transformer fuse. A few days later, a substation capacitor bank failed and also took out the distribution substation bus. Several other outages occurred but nothing was found. Upon further investigation, it was discovered that the breaker settings were incorrect to coordinate with other circuit equipment.

Actions Taken or Planned

The shield wire was replaced. The feeder breaker settings have been corrected to provide correct coordination with other circuit equipment. No additional actions are being planned.

Approximate cost of actions: \$1000

Substation V61, Circuit 563

Outage History

There were a total of 19 outages that occurred on this distribution feeder. Six of the outages were caused by tree related contacts. Three of the outages were caused by thunderstorm activity. Four of the outages reported were due to high winds, where three of the four were caused by conductor contact taking out a fused disconnect. The fourth wind related outage resulted in five poles being broken due to the high winds. Three of the outages were due to unknown causes. Two of the outages were due to public accidents. A loose trailer hit and broke a pole and an irrigation rig was operating too close to our line, which caused another outage. And one outage was reported on due to galloping conductors.

Actions Taken or Planned

After the 6/28/98 storm, a number of critical locations were trimmed out in 1998 with additional trimming scheduled for 1999. The addition of line arresters is planned for 1999 at locations where there is a history of lightning damage. And the installation of line reclosers is planned for 1999 to increase the reliability of our overcurrent protection scheme on this circuit. All of the broken poles were replaced with no additional action being taken.

Approximate cost of actions: \$75,000

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Substation S93, Circuit 504

Outage History

This circuit experienced six complete interruptions in 1998. All interruptions can be attributed to storm (wind) conditions where trees are making solid contact with the line. When the breaker is reclosed, the line holds.

Actions Taken or Planned

The majority of the tree problem is related to primary metered customers own systems. Attempts will be made to have these customers trim their lines and apply proper fuse protection coordinating with Ameren-CIPS source devices.

Approximate cost of actions: \$2000

Substation S27, Circuit 599

Outage History

There were six recorded interruptions on this circuit all the result of tree problems.

Actions Taken or Planned

Substantial tree trimming, including the use of a hydro-ax, in this area should have taken care of the problem. No additional action is planned.

Approximate cost of actions: \$15,000

Substation Y20, Circuit 522

Outage History

This circuit experienced several interruptions, some storm related and some due to equipment failure. Most of these interruptions were the result of problems with the segment of line that feeds a small community. This segment of line is underbuilt on a 69KV line that goes through some wooded terrain. One outage resulted from a tree falling through the line in this section. Another outage was caused by a conductor failure in this section of line.

Actions Taken or Planned

Detailed line patrols of this section of line will be made in 1999. Actions will be taken to correct any maintenance problems that are discovered during these patrols.

Approximate cost of actions: \$5000

Substation T04, Circuit 512

Outage History

Five interruptions occurred on this circuit in 1998. Trees caused three interruptions, one by a public vehicle accident, and the cause of one was undetermined.

Actions Taken or Planned

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Tree trimming performed in 1998 should address the tree problems in this area. Therefore no additional work was performed or is planned to address the interruptions that were the result of the vehicle accident or the unknown cause.

Approximate cost of actions: \$10,000

Substation Y07, Circuit 576

Outage History

An interruption of this circuit occurred during storm conditions that caused the major portion of a tree to split and fall into our 12 kV line resulting in a broken corner pole. The removal of the tree and subsequent replacement of the pole occurred using several crews. The restoration was completed within what would be considered a normal amount of time for damage of this magnitude during non-working hours.

The failure of the tree located on private property created this failure and had clearances to the trimming requirements for a 12 kV line.

Actions Taken or Planned

This circuit and area has tree clearance that meets or exceeds Ameren-CIPS standards. The location where this structure failed affected approximately 680 customers. An alternate feed to this section of line will be considered as an existing subdivision continues to expand. No other problems were found on this circuit during further inspections.

Substation U84, Circuit 534

Outage History

This circuit experienced five outages, one was an unknown cause, and a static wire that failed falling into the 12 kV distribution caused another. The other three were related to trees with tree contact identified as one cause and a broken limb creating the other two outages with the second being caused by the same limb but was not found during first patrol of the line.

Actions Taken or Planned

In 1999 Ameren-CIPS crews trimmed the trees in the area which was creating the tree problems on this circuit. The rest of the circuit is in good mechanical condition and no other problems have been found. No other actions are planned at this time.

Approximate cost of actions: \$10,000

Substation S15, Circuit 560

Outage History

This circuit experienced four interruptions in 1998. Wind and trees were the cause of three of the interruptions and a crane in the line the cause for the fourth.

Actions Taken or Planned

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The line will be inspected for further tree trimming.

Approximate cost of actions: \$5000

Substation U42, Circuit 512

Outage History

There were four outages on this line of which two were caused by public accidents and a third was planned for line repair. The remaining outage was of unknown nature.

Actions Taken or Planned

There are no plans for anything further to be done to this line.

Substation Y04, Circuit 504

Outage History

The unscheduled outages that occurred in 1998 on this circuit were due to trees or limbs on the primary. The line is located along a heavily forested area and was last trimmed in 1996.

Actions Taken or Planned

The line is scheduled to be trimmed during the summer of 1999.

Approximate cost of actions: \$10,000

Substation T11, Circuit 508

Outage History

There was one recorded interruption on this circuit with duration of 21 hours and 3 minutes. The interruption was the result of a tornado that broke seven 69 kV sub-transmission poles with 12 kV underbuild.

Actions Taken or Planned

The seven mentioned poles were replaced utilizing all available resources. Since this tornado was hopefully a one-time incident, no other action is planned.

Substation T04, Circuit 513

Outage History

Only one interruption was recorded on this circuit, and a fallen tree caused it.

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Actions Taken or Planned

This entire circuit was trimmed in 1998 hopefully alleviating the problem.

Approximate cost of actions: \$10,000

Substation S86, Circuit 597

Outage History

This circuit experienced two interruptions in 1998. A tree growing in the line caused the first and the second was the result of a severe windstorm that caused multiple trouble spots.

Actions Taken or Planned

Tree trimming has been taking place in this community nearly all year. This circuit was completely trimmed. No further action is planned at this time.

Approximate cost of actions: \$10,000

Substation S22, Circuit 595

Outage History

The interruption on this circuit involved 48 customers off from 0403 to 0515. After switching the two remaining customers had service restored by 1233. The interruption was due to a tree blown into the line.

Actions Taken or Planned

The tree was outside our standard trimming right of way and was cleared to prevent future problems. No further action is planned.

Substation X55, Circuit 542

Outage History

An interruption on this circuit occurred after a storm caused the failure of eight 69 kV Sub-Transmission poles that had a 12 kV Distribution Circuit underbuilt on this portion of the line. The outage affected 20 customers that unfortunately could not be fed from an alternate source. These poles were replaced using crews from several Operating Centers and was completed in a short time within what would be considered a normal amount of time for damage of this magnitude during non working hours.

Actions Taken or Planned

The structural strength of this 69 kV line was reviewed and found to support NESC Grade B design criteria for the Interstate Highway crossing and in adjacent spans. The rest of the line was designed to a 70-mph wind loading. The construction of an alternate feed to this remote area could not be justified for an abnormal storm contingency.

Substation Y20, Circuit 2

Outage History

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This circuit experienced an extended outage on March 9, 1998. The outage was a result of galloping conductors during a major ice storm that caused the substation breaker to lock out. This storm was the first major storm to hit a widespread area at Ameren-CIPS' Northern Prairie Region following the implementation of a new outage analysis system and central dispatching for trouble calls. The confusion that arises during any major storm, compounded by the unfamiliarity with the new system, prolonged the outage beyond what would normally be expected.

Actions Taken or Planned

At this time, no additional actions are required. Both regional personnel and the central dispatch office have become proficient with the use of the outage analysis system for emergency restoration and extended outages due to this type of situation will not occur in the future.

Substation Y59, Circuit 520

Outage History

This circuit experienced extensive outages in March of 1998. The outages resulted from a major ice storm that hit the area on March 9, 1998 and caused extensive damage to the 69KV line feeding the distribution substation. This storm also caused extensive damage to the 69KV line feeding the substation that provides an alternate feed to this circuit. Most of the damage resulted from galloping conductors breaking crossarms and other hardware.

Actions Taken or Planned

No actions are planned for the distribution circuits. However, in 1999, air flow spoilers will be installed on the 69KV line feeding the substation which provides the alternate feed. While this will not eliminate galloping related outages for this circuit, it will provide a good alternate feed. This will significantly reduce the duration of any galloping outages.

Approximate cost of actions: \$5000

Substation S79, Circuit 510

Outage History

There were three recorded interruptions on this circuit in 1998 with a cumulative duration of 18 hours and 38 minutes. One of these interruptions was caused by a tree and accounted for most of the minutes. The tree problem was quickly isolated and power was restored to 70% of the circuit's customers. The other two outages were short and were caused by a burned jumper and a blown fuse on a 69 kV capacitors rack.

Actions Taken or Planned

The tree problem has been corrected and the other two interruptions were of a routine non-recurring nature. No further action is planned.

Substation V95, Circuit 586

Outage History

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This circuit experienced two outages in 1998. The first was related to a broken tree limb. The second was high wind related which caused a pole to fail. The pole was in the main radial feed to a small rural community and resulted in a lengthy outage.

Actions Taken or Planned

In 1999, a major storm affected this radial feed to this rural community and at that time a tap was constructed to another utility to provide an alternate source to feed this town. The construction of this tap will decrease the length of outages when similar problems develop on the main feeder to this community. No other work is planned at this time for this circuit.

Approximate cost of actions: \$5000

Substation Z16, Circuit 518

Outage History

This circuit experienced a late night underground cable fault on a radial feed serving 4 commercial customers. After replacing a section of the failed cable, one of the transformers was found to also have a bad bushing which had to be replaced, which lengthened the time of the outage.

Actions Taken or Planned

No further action is planned.

Substation S13, Circuit 550

Outage History

This circuit experienced only one interruption in 1998. The interruption was an extended one due to a windstorm that affected the entire operating area.

Actions Taken or Planned

The poles broken and wire damaged during the storm were repaired. No further action is planned.

XIII. Company Contact

For further information regarding this report, contact:

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